

EUROMECH Colloquium 575

“Contact mechanics and coupled problems in surface phenomena”

30 March – 2 April, 2015, Lucca, Italy

Chairperson: Prof. Marco Paggi

Co-Chairperson: Prof. David Hills

Organisation

EUROMECH Colloquium 575 was organised under the patronage of various public authorities and associations: Città di Lucca, Provincia di Lucca, Regione Toscana, Assindustria Lucca, Lucense SCpA. The Scientific Committee, composed of worldwide experts in contact mechanics, is listed at <http://575.euomech.org/committees>.

Their work in promoting the Colloquium is gratefully acknowledged.

The scientific programme of Colloquium 575 featured 43 talks of 30 minutes each. This format was chosen primarily to promote discussion and interaction among participants, in line with the aims of EUROMECH Colloquia. A booklet containing the 43 abstracts of the talks was distributed to the participants in paper version and can be downloaded from <http://575.euomech.org/program/scientific-program>.

Background

Following previous Colloquia on Contact Mechanics and related areas: "New Trends in Contact Mechanics" (Cargese, 2012), "Nonsmooth Contact and Impact Laws in Mechanics" (Grenoble, 2011), "Contact Mechanics of Coated Bodies" (Moscow, 2002), EUROMECH Colloquium 575 demonstrated the emergence of new topics of research and open problems within topics that are summarised below.

Colloquium Topics

1. Frictional contacts and coupling between normal and tangential loading problems;
2. Multi-scale modelling of tribological problems;
3. Coupling between elastic and thermal fields in contact problems;
4. Coupling between elastic and electric fields in contact problems;
5. Solid-fluid interaction and related coupled problems;
6. Contact and wear;
7. Contact and fracture of heterogeneous materials or involving materials with voids;
8. Contact mechanics applied to biological systems, functional surfaces and thin films.

Concluding Remarks and the Prospect for Future Colloquia

EUROMECH Colloquium 575 showed a balance between analytical methods, numerical techniques, and experimental investigations. Mathematicians, physicist and engineers shared their points of views on methods and applications of contact mechanics. Active discussion between participants took place during the whole Colloquium, promoted by the choice of slots of 30 minutes for each talk and the pleasant atmosphere inside the IMT Campus of San Francesco. In spite of the long-standing tradition of the Contact Mechanics discipline, many theoretical and computational aspects remain only partially solved today. Moreover, novel areas of application of Contact Mechanics, such as in bioengineering and in composite materials, open new frontiers for research requiring further experimental confirmation.

The organisers of EUROMECH Colloquium 575 believe there is room for further exploratory colloquia on contact mechanics. These might be on a bi-annual basis, either on specific topics like contact mechanics between rough surfaces, or on topics breaking the walls between specific disciplines to foster the discussion of contact mechanics problems within a multidisciplinary perspective. This aim is not in conflict with established thematic conferences in the field and would help to enlarge the contact mechanics community.